

## CLAIMS

1. An adjustable hydraulic press with both upper and lower double action  
5 comprises a main body and a hydraulic system, wherein the main body  
comprises a column (8), an upper beam (1) and a lower beam (21) fixed on  
the upper and lower ends of the column (8), a main slide block (9) and a hold  
down slide block (13) sliding fit with the column (8), and a fixing worktable  
(14) and a floating worktable (15) fixed on the column (8), characterized in  
10 that a plunger (6) of a master cylinder (2) fixed on the upper beam (1) and  
plungers (7) of four auxiliary cylinders (5) fixed on the upper beam (1) are  
connected to the main slide block (9) and drive it, the hydraulic pressure  
chamber of a gas-liquid power accumulator (11) fixed in the main slide block  
(9) communicates to the hydraulic pressure chamber of a hold down cylinder  
15 (10) fixed in the main slide block (9) by a connecting pipe (32), the plunger  
(12) of the hold down cylinder (10) is connected to the hold down slide block  
(13) and drives it, tools and moulds or ejecting mould can be fixed on the  
upper surface of a plunger (22) of a ejecting cylinder, a snap ring groove (23)  
is provided at the upper end of the plunger (22) of the ejecting cylinder to  
20 elevate the floating worktable, a snap ring can be mounted in the snap ring  
groove (23) or removed from it, after loading the snap ring, the plunger (22)  
of the ejecting cylinder can eject the floating worktable (15) to a  
predetermined height.

2. The adjustable hydraulic press with both upper and lower double  
25 action according to claim 1, wherein the fixing worktable (14) is located  
between the hold down slide block (13) and the floating worktable (15), the  
floating worktable (15) is located between the fixing worktable (14) and the  
lower beam (21), the floating worktable (15) sliding fits with the column (8),

the ejecting cylinder (17) is fixed on the lower beam (21), the plunger (22) of the ejecting cylinder (17) can pass through a center hole of the floating worktable (15).

3. The adjustable hydraulic press with both upper and lower double  
5 action according to claim 1, wherein the air pressure of the high pressure nitrogen (35) in the gasbag (34) of the gas-liquid power accumulator (11) fixed on the main slide block (9) balances with the hydraulic pressure of the high pressure oil (33) in the hydraulic chamber of the gas-liquid power accumulator, the pressure of the high pressure oil (33) balances with the  
10 hydraulic pressure of the hold down cylinder (10) by the connecting pipe (32), a charge valve (36) and a pressure gauge interface (37) are fixed on the gas-liquid power accumulator (11).

4. The adjustable hydraulic press with both upper and lower double  
action according to claim 1, wherein the master cylinder (2) and the four  
15 auxiliary cylinders (5) are fixed in the upper beam (1), the upper and lower hydraulic chambers of the master cylinder (2) and the four auxiliary cylinders (5) are connected each other through a connecting pipe (28) and a connecting pipe (29) respectively, the master cylinder (2) is equipped with a load hydraulic pipe (3), which doubles as a backstroke discharged pipe and a  
20 backstroke hydraulic pipe (4), which doubles as a load discharged pipe, the load hydraulic pipe (3) and the backstroke hydraulic pipe (4) are connected to a high pressure liquid source, the backstroke discharged pipe (3) and the load discharged pipe (4) are connected to a tank.

5. The adjustable hydraulic press with both upper and lower double  
25 action according to claim 1, wherein resetting slide rod (24) of the hold down slide block (13) pass through the main slide block (9), a position-limiting nut (2) connected to the resetting slide rod (24) by screw thread is used to adjust the maximal space between the two slide blocks.

6. The adjustable hydraulic press with both upper and lower double action according to claim 1, wherein a snap ring groove (23) is provided at the upper end of the plunger (22) of the ejecting cylinder to elevate the floating worktable (15), after installing the snap ring in the snap ring groove (23), the  
5 plunger (22) of the ejecting cylinder can elevate the floating worktable (15) to a predetermined height and the floating worktable (15) is locked by a position-limiting nut (16) for the floating worktable.

7. The adjustable hydraulic press with both upper and lower double action according to claim 1, wherein the water-cooling jackets (27, 26, 30, 31,  
10 18) are installed on the outerwalls of the master cylinder (2), the auxiliary cylinder (5), the hold down cylinder (10), the gas-liquid power accumulator (11) and the ejecting cylinder (17) respectively, a spiral separator plate (59) is provided in each water-cooling jacket, a connecting pipe (57) and a connecting pipe (58) are provided at the upper and lower ends of the  
15 water-cooling jacket (31) of the gas-liquid power accumulator and the water-cooling jacket (30) of the hold down cylinder respectively, a connecting pipe (62) and a connecting pipe (61) are provided at the upper and lower ends of the water-cooling jacket (27) of the master cylinder and the water-cooling jacket (26) of the auxiliary cylinder respectively.

20 8. The adjustable hydraulic press with both upper and lower double action according to claim 1, wherein a water inlet (60) and a water outlet (61) are provided at the upper and lower ends of the water-cooling jacket (27) of the master cylinder respectively, a water inlet (55) and a water inlet (56) are provided at the upper and lower ends of the water-cooling jacket (31) of the  
25 gas-liquid power accumulator respectively, a water inlet and a water outlet are provided at the upper and lower ends of the water-cooling jacket (18) of the hold down cylinder respectively, all the water inlets of the water-cooling jackets are connected to the water outlets of a cooling system, and all the

water outlets of the water-cooling jackets are connected to the water inlets of the cooling system.

9. The adjustable hydraulic press with both upper and lower double action according to claim 3, wherein the gasbag (34) of the gas-liquid power  
5 accumulator (11) can be replaced by a piston (39) and a seal ring (40).

10. The adjustable hydraulic press with both upper and lower double action according to claim 1, wherein it is used to process cylindrical spur gear.